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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
RICKMAN, HOLLY C	
ART UNIT	**PAPER NUMBER**
1773	

DATE MAILED: 06/30/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/052,003	HONG ET AL.	
	Examiner	Art Unit	
	Holly Rickman	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 September 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) *11-15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Newly amended claims 11-15 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: original claims 11-15 included only the nominal process steps of "forming" and thus, were not restrictable from articles claims 1-10. However, claim 11 has been amended to require a substantive process step, that is, "a portion of the chromium diffuses into the magnetic material." This claim, and all claims depending therefrom, are now patentably distinct from claims 1-10 because the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). For example, the invention of claims 1-10 can be made by a process wherein Cr is added to the magnetic layers during sputtering and further heat treatment results in a decoupled, granular layer with Cr at the grain boundaries.

Furthermore, the inventions set forth in claims 1-10 and claims 11-15 have now acquired a separate status in the art and are classified in 428/694TM and 427/130. Examination of the two distinct inventions would place an undue burden on the examiner. As such, restriction for examination purposes as indicated is proper

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 11-15 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-10 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a Ru layer, does not reasonably provide enablement for "a layer of anti-ferromagnetic material." The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. From the context of the specification, it appears that by "anti-ferromagnetic material" Applicant intended to claim an antiferromagnetic coupling material. However, there is no support in the specification for anything but a Ru layer disposed between two magnetic layers to form an AFC structure.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Do et al. (US 6372330).

Do et al. disclose a magnetic recording medium having a non-magnetic substrate, an underlayer, a first magnetic layer, a non-magnetic spacer layer, a second magnetic layer, and

another spacer layer thereon. Additional antiferromagnetically coupled magnetic layers are deposited thereon and an overcoat is deposited on top of these layers (see Fig. 6). The reference teaches that the non-magnetic spacer layers can be formed from any one of Ru, Cr, Rh, Ir, and Cu (col. 3, lines 57-66). An example is described wherein both spacer layers are formed from Ru (col. 8, lines 18-36). The reference also teaches that the spacer layer 36' can be formed from the same material used for the non-magnetic spacer layers. An example using a Cr layer is given (col. 8, lines 28-36). It would have been obvious to one of ordinary skill in the art at the time of invention to choose Cr from the group of spacer layer (36') materials disclosed by Do et al. in view of the functional equivalence of the materials.

It is noted that the limitation "a portion of said chromium diffuses into said top magnetic layer" is a process limitation in an article claim. The limitation has been considered insofar as is affects the structure of the claimed invention. The diffusion of Cr into the top magnetic layer would clearly result in the presence of Cr in the top magnetic layer.

Do et al. teach the use of granular ferromagnetic layers formed from CoPtCrB alloys. Thus, the aforementioned limitation reads on the Cr-containing Co alloy magnetic layers taught by Do et al.

6. The rejection of claims 1-4 and 11-14 under 35 U.S.C. 103(a) as being unpatentable over Do et al. (US 6372330) is withdrawn.

7. The rejection of claims 5 and 15 under 35 U.S.C. 103(a) as being unpatentable over Do et al. (US 6372330) in view of Shimizu et al. (US 2002/0127433) is withdrawn.

8. Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Do et al. (US 6372330) in view of Bian et al. (US 6572989).

Do et al. disclose a magnetic recording medium having a non-magnetic substrate, an underlayer, a first magnetic layer, a non-magnetic spacer layer, a second magnetic layer, and another spacer layer thereon. Additional antiferromagnetically coupled magnetic layers are deposited thereon and an overcoat is deposited on top of these layers (see Fig. 6). The reference teaches that the non-magnetic spacer layers can be formed from any one of Ru, Cr, Rh, Ir, and Cu (col. 3, lines 57-66). An example is described wherein both spacer layers are formed from Ru (col. 8, lines 18-36). The reference also teaches that the spacer layer 36' can be formed from the same material used for the non-magnetic spacer layers. An example using a Cr layer is given (col. 8, lines 28-36). It would have been obvious to one of ordinary skill in the art at the time of invention to choose Cr from the group of spacer layer (36') materials disclosed by Do et al. in view of the functional equivalence of the materials.

It is noted that the limitation "a portion of said chromium diffuses into said top magnetic layer" is a process limitation in an article claim. The limitation has been considered insofar as is affects the structure of the claimed invention. The diffusion of Cr into the top magnetic layer would clearly result in the presence of Cr in the top magnetic layer.

Do et al. teach the use of granular ferromagnetic layers formed from CoPtCrB alloys. Thus, the aforementioned limitation reads on the Cr-containing Co alloy magnetic layers taught by Do et al.

The reference is silent with respect to the specific elements of the magnetic recording apparatus for use therewith.

Bian et al. teaches a conventional disk drive structure which includes a recording medium, a plurality of actuator arms, a spindle and spindle motor, magnetic head, and a voice control motor (col. 5, lines 24-62).

It would have been obvious to one of ordinary skill in the art at the time of invention to use a conventional recording head assembly such as the one taught by Bian et al. in combination with the recording medium taught by Do et al. in order to form a functional disk drive.

9. The rejection of claim 10 under 35 U.S.C. 103(a) as being unpatentable over Do et al. (US 6372330) in view of Bian et al. (US 6572989) and further in view of Shimizu et al. (US 2002/0127433) is withdrawn in view of Applicant's amendments.

Response to Arguments

10. Applicant's arguments filed 9/22/03 have been fully considered but they are not persuasive. Applicant argues that Do et al. do not teach or suggest a chromium layer that diffuses into the top magnetic layer as required by the present claims. As noted above, this limitation is a process limitation in article claims. It has been held that even though product-by-process claims are limited and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

It is the Examiner's contention that the magnetic recording medium taught by Do et al. is the same as the claimed structure for the reasons set forth above. Thus, in the absence of evidence of unexpected results associated with the claimed process limitation, the claims remain unpatentable over Do et al.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Holly Rickman whose telephone number is (571) 272-1514. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul J. Thibodeau can be reached on (571) 272-1516. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Holly Rickman
Primary Examiner
Art Unit 1773

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June 2, 2004